UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
BAKER, STEPHEN M

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2133	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _16 November 2001_ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under _Ex parte Quayle_, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-42_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _15 and 26-41_ is/are allowed.

6)☒ Claim(s) _1-14,17-19,21,23,25 and 42_ is/are rejected.

7)☒ Claim(s) _16,20,22 and 24_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _06 July 2001_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _2,4_ .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

DETAILED ACTION

Drawings

1.   The drawings are objected to because Figure 5 apparently incorrectly suggests

that a re-ordering operation is sufficient to form a constituent injection code 2 from a

constituent injection code 1 in apparently omitting a second injection coding operation.

2.   The drawings are objected to under 37 CFR 1.83(a). The drawings must show

every feature of the invention specified in the claims. Therefore, N-state sequencers

with N = 8, 16 and 32, as required by alternatives within claims 11 and 39, must be

shown or the features canceled from the claims. Furthermore, a re-ordering operation

producing a "plurality of other sequences of coded data elements", as required by claim

8, must be shown or the features canceled from the claim. No new matter should be

entered.

3.   A proposed drawing correction or corrected drawings are required in reply to the

Office action to avoid abandonment of the application. The objection to the drawings

will not be held in abeyance.

Specification

4.   The disclosure is objected to because of the following informalities:

Applicant's description of a single parity check code as a convolutional code

contradicts conventional terminology, creating needless confusion. The statement that

"an SPC code can in fact be considered to be a two-state systematic convolutional

code, with a terminated (flushed) trellis, and parity puncturing", found at the bottom of page 1, is about equally as useful as stating that "a short round peg in fact can be considered a long square peg with the ends and corners removed", seeing as there is nothing "convolutional" about a single parity check code. Accordingly, on page 1, lines 30-32, "an SPC code can in fact be considered to be a two-state systematic convolutional code, with a terminated (flushed) trellis, and parity puncturing" apparently should be "an SPC code can in fact be generated by a two-state systematic convolutional code encoder, with the trellis terminated (flushed), and with parity puncturing". Applicant re-iterates the misleading description on page 4, again apparently confusing a code with an encoding. Accordingly, on page 4, at lines 27-29, ", but as mentioned earlier, these can be considered to be convolutional codes" apparently should be deleted.

On page 2, in lines 1-4, with reference to "data elements that are shared between constituent codes of a composite code", the adjectives "shared", "overlapped" and "interlocked" are described as being synonymous, however the rest of the disclosure in part appears to use these terms in different ways, and the meaning of "shared" is apparently only straightforwardly understandable when applied to the relationship between systematic code bits left nonpunctured in the outputs of multiple constituent code encoders, in which case all systematic bits would have multiple copies and thus be "shared" bits. However, for typical "composite codes" ("concatenated codes", to use the normal term of art), only the systematic bits from one constituent code encoder are left nonpunctured.

Regarding the discussion of Turbo codes (also referred to by applicant as "PCCC codes") on page 2, in line 11, "A PCCC code" apparently should be "A completely nonpunctured PCCC code", as applicant elsewhere refers to a conventional PCCC code of rate 1/3, which presumably has punctured (omitted) one of the "systematic portions" mentioned in line 13, *i.e.* the interleaved systematic bits; in line 15, after "convolutional code.", "Normally, the interleaved systematic data elements are punctured in a PCCC code." apparently should be inserted, for clarity and consistency; in line 21, "A Turbo code" apparently should be "A completely nonpunctured Turbo code"; in line 27, "interleaved bits" would be clearer as "interleaved systematic bits"; in line 30, "interleaved data elements" would be clearer as "interleaved systematic data elements".

Regarding the discussion of Turbo codes on page 3, the references to "interlocked (interleaved) weight" are vague and apparently elliptical, and appear to be adequate only to the extent that they may relate to errors in all copies of a systematic bit (requiring a completely nonpunctured composite code, as discussed above), if "interlocked" and "shared" are to mean the same thing. The terms "interleaved" and "interlocked" appear to be incorrectly used as equivalents. It is not clear how the discussion would need to be modified to apply to a typical Turbo code.

Regarding the discussion of SCCC codes on pages 3-4, in lines 28+ on page 3, the effort to draw a distinction over PCCC codes based on an SCCC's "first constituent code" alone is apparently incorrect, as the first constituent code of an SCCC may be the same as the first constituent code of a PCCC. References to a property that "more than one data element is interleaved (or, more precisely, more data elements are interleaved

than are necessary to determine the state transition)" are not understandable, regardless of whether they pertain to the first constituent code of an SCCC, or to the entire composite SCCC. The terms "interleaved" and "interlocked" are apparently incorrectly used as equivalents and the discussion's context does not apply clearly to either term.

Regarding the discussion of H-TCC codes on page 4, the same problem exists with regard to the description of data elements as being "interleaved" as is noted above with regard to the discussion of SCCCs. The terms "interleaved" and "interlocked" are apparently incorrectly used as equivalents and the discussion's context does not apply clearly to either term.

The vagueness of Figure 5 in seemingly suggesting that one injection coding operation and one re-ordering operation is sufficient to form injection code 2 appears to have generated a number of misstatements: on page 8 at lines 8 and 18, "re-ordered" apparently should be "re-ordered and further encoded", as re-ordering alone is apparently not sufficient to satisfy constraints of a code such as *e.g.* an RSC as mentioned on page 8 at line 11, where apparently applied as an inner code upon an "injection" code. On page 9 at line 15, "re-ordered" apparently should be "re-ordered before being further encoded".

On page 17 at lines 17-18, characterizing Fig. 3 as representing a "flowchart" showing "method steps" is apparently incorrect, as a typical flowchart process is carried out by moving through the flowchart one procedural unit at a time, whereas Fig. 3 apparently characterizes an apparatus wherein all procedure units are substantially

performed simultaneously and there is no movement of active processing going from one procedure unit to the next. Accordingly, on page 17 at line 17, ", a flowchart showing method," apparently should be "or". On page 17 at lines 19-20, characterizing Fig. 3 as "a definition of a code" is confusing, as Fig. 3 shows a generalized encoder. Accordingly, on page 17 at line 19, "or as a definition" apparently should be "and provides a definition".

Beginning on page 31, the discussion of DIDI codes in many instances, similar to the previous discussion of Turbo codes, appears to indicate that the overall coding generates interleaved source bits in coded output along with the non-interleaved source bits, and apparently confuses source and injection data. However, as the rate of the DIDI code example is given as ¾ (page 33 at line 2) for the concatenation of two rate-7/8 injection codes, it cannot be the case that both interleaved and non-interleaved versions of the source bits are in the final coded bits. On page 33 at line 24, "The overall code rate" apparently should be "If all the interleaved source data bits are punctured from the code, the overall code rate". On page 33, "Each" apparently should be "Prior to puncturing out all the interleaved source bits, each".

Further regarding DIDI codes, the description in many places, such as regarding the "overall composite code" parity check matrix shown on page 38 at line 5, appears to suggest no more than a parallel concatenation of injection codings. However, statements that "all the primary coded data elements of one injection code overlap with those of the other injection code" on page 31 at lines 24-25, and "the primary coded data elements of each constituent injection code overlap completely with the primary

coded data elements of the other constituent injection code" on page 31 at lines 28-31

suggest that a DIDI code is a serial concatenation of injection codings or a parallel

concatenation of injection codings further involving feedback from the second injection

encoder to the first injection encoder. None of Figures 5-7 is at all suggestive of this

aspect, however, and thus a DIDI encoder is apparently not adequately shown by any

drawing provided.

On page 3, at line 20, "are provided" apparently should be "can be provided", in

view of subsequent lines 23-24. On page 5 at line 29, as the so-called "state

sequencer" unit (102) in Fig. 1 has yet to be discussed, "state sequencing state"

apparently should be "state"; at lines 32-33, "for state transition intervals with inserted

data elements," apparently should be deleted. On page 6, at lines 2-3, "state sequencer

state" apparently should be "state"; at lines 30-31, "equal to" appears to be incorrect and

apparently should be "unchanged in", as the "coded data elements" are understood to

be merely a part of the "data organization output sequence". On page 6 at line 14, page

10 at lines 9-10, and page 11 at line 10, "on an ongoing basis inserted data elements"

appears to be poorly worded and apparently should be "inserted data elements inserted

on an ongoing basis". On page 8 at line 12, the intended distinction between

"consistent" and "identical" is not apparent; at line 33, "be" has apparently been deleted

from "it is to (be) understood" and "more generally" apparently should be set off by

commas. On page 12, lines 11-13 are apparently unnecessary and poorly worded. On

page 12 at line 19, the comma apparently should be "or". On page 31 at line 33 and

page 32 at lines 2, 4-5 and 16, "injection code" apparently should be "injection code

encoder". On page 32 at lines 6-7, "The second sequencing bit stream 402 is identical to that of the first bit stream 400, but reordered" apparently should be "The systematic bits in the second sequencing bit stream 402 are identical to the systematic bits in the first sequencing bit stream 400, but reordered". On page 32 at lines 14 and 15-16, "injection codes" apparently should be "injection code encoders". On page 36 at line 8, "a code structure" apparently should be "an encoder". On page 33 at line 6, "re-ordered (interleaved) between the two constituent injection codes" apparently should be "in the composite code".

Appropriate correction is required.

Claim Objections

5.   Claims 4, 5, 8-10, 14, 16-19, 20-24 and 40-42 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claims, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form.

Regarding the "composite code encoder" defined by claims 4, 5 and 8: in order to properly further limit, *i.e.* give further definition to, the "encoder" of depended-upon claims, all encoder limitations recited in the depended-upon claims should be clearly incorporated, instead of apparently merely incorporating only the previously-claimed "coded data series" that satisfies "a first set of constraints equivalent to the encoder".

Regarding the "encoder" defined by claim 9: all encoder limitations recited in the depended-upon claims should be clearly incorporated, instead of apparently merely incorporating only the encoded data that "at least twice satisfies a set of constraints equivalent to those satisfied by the sequence of primary coded data elements (produced by the encoder)".

Regarding the "encoder" defined by claims 16-19: in order to properly further limit, *i.e.* give further definition to, the "encoder" of depended-upon claims, all encoder limitations recited in the depended-upon claims should be clearly incorporated, instead of apparently merely incorporating only the previously-claimed "coded data series" that satisfies "a set of constraints equivalent to the encoder".

Regarding claims 10 and 20: "encoding circuitry" is apparently already implicit in the encoder component coupling limitations of the depended-upon claims.

Regarding the "method of generating an interleaver" defined by claim 14: all encoder limitations recited in the depended-upon claim should be clearly incorporated, instead of apparently merely mentioning only the previously-claimed encoder as an eventual use for an interleaver produced by the claimed method.

Regarding the "decoder" defined by claims 21-24: all encoder limitations recited in the depended-upon claims apparently should be clearly incorporated in effect (e.g. the encoder should be recited as part of a "coding system" including the decoder), instead of apparently merely incorporating only "consistency" with the previously-claimed encoder's code characteristics as part of an intended use.

Regarding the decoding "medium" defined by claims 40 and 41: all encoding

medium limitations apparently recited in the depended-upon claim should be clearly

incorporated, instead of apparently merely incorporating only the previously-claimed

encoding's produced code as part of an intended use.

Regarding the decoding "medium" defined by claim 42: all encoder limitations

apparently recited in the depended-upon claim should be clearly incorporated, instead

of apparently merely incorporating only the previously-claimed encoder's produced code

as part of an intended use.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

7.   Claims 1-14, 17-19, 21, 23, 25 and 42 are rejected under 35 U.S.C. 112, second

paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention.

Regarding claim 1: alternatives requiring the "inserted data element" to be either

"i) one state-derived data element being output by the state-to-data-elements converter

at one time" or "ii) a sum of one state-derived data element being output by the state-to-

data-elements converter at the given time instant and a linear combination of source

data elements being output by the data organization component at the given time

instant" are apparently alternative embodiments respectively including and omitting

disclosed optional logic (180) which generates "auxiliary coded data elements", however

such alternative embodiments are not here considered to be functionally equivalent and

thus apparently should be claimed separately. Furthermore, the claimed "linear

combination" in option "ii" apparently has no basis in the specification, at least in

reference to Fig. 3, as there are no specific examples for the matrix operators D (184)

and E (186), or corresponding functionality thereof, disclosed. Additionally for the

claimed "linear combination" in option "ii", presuming it should correspond in result to

the "auxiliary coded data elements", the claim is apparently incorrect in describing it as

being inserted by the data organization component (150). Furthermore, the reference to

plural "source data elements being output by the data organization component at the

given time instant" apparently limits the claim to an embodiment having multiple

"primary coded data elements" generated in parallel during one time interval (consistent

with Fig. 2), however the rest of the claim implies no such parallel operation, as each

data element stream is otherwise only described as an element "sequence", which

again apparently implies functionality for the matrix operators D (184) and E (186) that

is not specifically disclosed.

Regarding claim 4: in line 6 it is apparently incorrectly implied that re-ordering

the "first sequence" is sufficient to produce a "second sequence of coded data

elements" that would actually "satisfy the second set of constraints", apparently omitting

an essential second encoding step required to produce the "second sequence". Thus,

"satisfy" apparently should be "are further encoded to satisfy" or the like.

Regarding claim 5: for the same reason noted above regarding claim 4, in lines

4-6, "and which after being re-ordered to form a second sequence of coded data

elements, satisfy a second set of constraints" apparently should be "and which after the first sequence of primary coded data elements is re-ordered to form a second sequence of coded data elements, encodes the second sequence of coded data elements to produce an output sequence of coded data elements that satisfy a second set of constraints" or the like.

Regarding claim 8: for the same reason noted above regarding claim 4, in lines 8-9, "each other sequence of coded data elements satisfies a respective set" apparently should be "and further adapted to encode each other sequence of coded data elements to produce an output sequence of coded data elements that satisfies a respective set"

Regarding claim 9: "produce a sequence of coded data elements, wherein a self-interlocking sequence that is an ordering of the coded data elements that includes each coded data element at least twice satisfies a set of constraints equivalent to those satisfied by the sequence of primary coded data elements" is vague and confusing and apparently should be "produce a self-interlocking sequence of coded data elements, that at least twice satisfies a set of constraints equivalent to those satisfied by the sequence of primary coded data elements".

Regarding claims 12 and 13, "further adapted to produce auxiliary coded data elements" is confusing, as the "auxiliary coded data elements" are apparently already covered by option "ii" recited in claim 1.

Regarding claim 18, "auxiliary coded data elements" are apparently already covered by option "ii" recited in claim 1, so no definite further limit is apparent.

Regarding claim 19, no definite further limit is apparent.

Allowable Subject Matter

8.   Claims 15 and 26-41 are allowed.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

10.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Stephen M. Baker whose telephone number is (703)

305-9681. The examiner can normally be reached on Monday-Friday (11:00 AM - 7:30

PM).

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

        Information regarding the status of an application may be obtained from the

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Business Center (EBC) at 866-217-9197 (toll-free).

                                        Stephen M. Baker

Primary Examiner
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